FACULTY OF EDUCATION
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SUSTAINABILITY EDUCATION IN EARLY CHILDHOOD:

PRESCHOOL TEACHERS' PERCEPTIONS AND APPROACHES IN NURTURING SUSTAINABILITY EDUCATION PRACTICES

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Programme/course:	S2ESD ESD700
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Supervisors:	Ali Yildirim and Minna Panas
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Abstract

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Aim: This study aims to examine early childhood teachers' perceptions of Education for Sustainable Development as well as their pedagogical approaches for nurturing sustainability in Swedish preschools, and how their perceptions of ESD relate to their teaching strategies in nurturing sustainability education.

Theory: Lev Vygotsky's social constructivism emphasizes the significance of language and thought, social interaction, zone of proximal development, scaffolding, mediation, and collaborative work in learning. According to Vygotsky (1978), knowledge is constructed through interaction with others (Powell & Kalina, 2009). These concepts and principles establish the framework for examining Swedish preschool teachers' perceptions of ESD experiences with young pre-schoolers, and teaching approaches they are using in nurturing sustainability as well as how their perceptions of ESD relate to their teaching approaches.

Method: A phenomenological qualitative research approach was used to guide the methods used in this study. Data were collected through semi-structured interviews from preschool teachers and were analyzed by employing thematic content analysis (Braun and Clarke, 2006).

Results: One overall finding of the study is that teachers are familiar with Education for Sustainable Development (ESD) concept, and they use it as part of their regular educational teaching on daily basis. Six themes emerged in the teachers' perceptions of SD/ESD: SD as environmental responsibility; SD/ESD as an integration of environmental, social, and economic issues; SD as a means of minimizing carbon footprint; ESD as a lifelong process; ESD as a source of environmental awareness and behaviours; and ESD as skilled-based education to maintain life for future generation, and the approaches they reported involved seven thematic areas which involve different teaching practices, namely, taking children outdoors; scaffolding; hands-on participatory activities; collaborative teaching and group activities; play; engagement of children in close and larger community contexts; and making use of Swedish preschool curriculum. This study illuminates the results on the relations between the teachers' understanding and their approaches to promoting ESD. The teachers are unable to relate their understanding of ESD as integration of environment, social, and economic dimensions to their teaching approaches. As a result, this study concludes that teachers can establish better connections between their understanding to their teaching practices. Thus, there is a need to widen their knowledge of the three dimensions of ESD so that the interconnectedness of these can be understood to ensure the effective incorporation of ESD into their teaching practices in preschools.

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List of Acronyms

ECE- Early Childhood Education

EfS- Education for Sustainability

ESD- Education for Sustainable Development

IPBES- Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

IPCC- Intergovernmental Panel on Climate Change

IUCN- The International Union for Conservation of Nature

SD- Sustainable Development

UN- United Nation

UNEP- United Nations Environment Programme

UNESCO- United Nations Educational, Scientific and Cultural Organisation

WCED- World Commission on Environment and Development

WWF- World Wildlife Fund

ZPD- Zone of Proximal Development

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1. Introduction

Our planet is in perilous environmental, social, and economic conditions, and mismanaged human activities are posing a serious threat (Steffen et al., 2015; WWF, 2016), with negative consequences (Rockström et al., 2009). The capacity of the earth is being consumed so rapidly that it has become almost impossible to restore it (IPBES, 2019; WWF, 2016). Therefore, humanity faces serious worldwide problems such as climate change, extinction of species (Siraj-Blatchford, 2009), and earth's natural systems display several signs of ozone depletion, nitrification of the biosphere, lack of freshwater, pollution, due to overloaded consumption, and generation of wastes, and human populations (IPCC, 2007; Raworth, 2017; WCED, 1987). Hence, human actions are changing the environment in such a manner that is "unprecedented, unsustainable, undesirable, and unpredictable, a situation which presumably cannot be divorced from current education practice" (Palmer, 1999, p. 379). Such challenges and conditions impact humans, and non-humans, and the interaction between them. These circumstances also affect young children, and the consequences of these challenges are apparent in them; as sustainability issues are part of children's lives (Davis, 2010). Several researchers such as Davis (2008); Göpel (2016); and Wals (2007; 2012) urge bold actions to face these challenges, not just technical improvements, but also a shift in individual mindsets, notions, attitudes, and social norms up to social structures, processes, and systems. Taking radical actions and solutions entails engaging people in sustainability practices beginning from the early year stage (McKeown, 2002). We must learn to live sustainably to get out of our unsustainable situation (Wals, 2012). Thus, disrupting and transforming essentially unsustainable habits, routines, and systems are required to combat these impacts (Wals, 2007).

There is a rising awareness that Sustainable Development (SD) is the way forward and that it could be achieved through education using Education for Sustainable Development (ESD). UNESCO views education in all its forms as a vehicle for bringing about the change that is urgently required to overcome unsustainability; as a result, unsustainability should be changed and surmounted via education (UNESCO, 2005; 2009). Education allows "individual freedom

and empowerment" and accordingly has been discovered as significant for enhancing people's lives (UNESCO, 2015a). Education is required to develop an individual's SD knowledge, understanding, skills, and competencies. Education has a key role in promoting/supporting SD, given the current global demand for SD and the compelling need for actions. It is critical to comprehend the notion of SD even though it is seen as imprecise and normative, it encompasses substantial theoretical and ideological frictions as Jickling and Wals (2008), and Sandell and Öhman (2012) claim.

Even though SD is broad, it is generally accepted that it requires the merging of three pillars- economic, environmental, and social (Sandell et al., 2005). Corresponding to this, Davis (2010) states that SD is a holistic concept that considers social, economic, political, and natural aspects. The ambiguity of SD (Bolis et al., 2014; Jickling & Wals, 2008), and its application in education result in a wide variety of teaching methods/approaches and objectives. According to the Brundtland Commission's report, *Our Common Future,* SD seeks to "meet the needs of the present, without compromising the ability of future generations …" (WCED, 1987). SD is a "development which improves people's quality of life, within the carrying capacity of earth's life support systems" (IUCN, UNEP, WWF, 1991). SD is accomplished via a holistic approach and interdisciplinary endeavors from the three dimensions to adjust to our lifestyles within Earth's capacity amongst social efforts. Educational efforts and activities are thus, critical to creating a more sustainable future in terms of environmental integrity, economic viability, and equitable society for the current and future generations, as indicated by the Decades of Education for Sustainable Development (UNESCO, 2005). As a result, ESD is recognized as a tool to achieve sustainable development in the face of the world's continuous challenging issues (United Nations, 2017). It is a way of linking education and SD (Corney & Reid, 2007), and it should lead to sustainable practices (Orr, 1994). ESD is a multidimensional subject/issue, and it is best known and understood in terms of three interrelated pillars of SD- social, economic, and environmental. It means encompassing,

> key sustainable development issues into teaching and learning, for example, climate change, disaster risk reduction, biodiversity, poverty reduction, and sustainable consumption. It requires participatory teaching and learning methods that motivate and empower learners to change their behaviours and act for sustainable

> development. ESD consequently promotes competencies like critical thinking, imagining future scenarios, and making decisions in a collaborative way (UNESCO, 2014).

It is also a holistic term, and it gives tools that allow and empower citizens across the planet to learn their way out of unsustainability (Wals, 2012), in this way teaching and educating for SD.

Education, precisely in the early years stage, must incorporate ESD into its practice and training since sustainability has massive implications, to encourage and support the transformation to a more sustainable future. Early childhood education should thus engage young pre-schoolers in sustainability education to create a sustainable world since ESD seeks to enable individuals of all ages to take on the task of ensuring a sustainable future (UNESCO, 2009). Education for Sustainable Development in early childhood education is considered as a "natural starting point" for lifetime learning (The Gothenburg Recommendations on Education for Sustainable Development, 2008). Correspondingly, scholars such as Davis (2010); Davis (2015); Kaga (2008); Pramling Samuelsson (2011); and Wilson (2000) articulate that education for sustainable development must begin in the early years and play a critical role in creating long-term behaviours and attitudes. Hence, in order to recognize the integration of the economic, environmental, and sociocultural components of ESD within early childhood education for sustainability, a holistic standpoint has been claimed as essential (Hedefalk, Almqvist, & Östman, 2014). Children as competent actors capable of critical thinking and action should be encouraged and supported by such a perspective (Hedefalk, Almqvist, & Östman, 2014). Looking into the elementary values of ESD in terms of having suitable practices, perceptions, and attitudes to preserve the natural environment, reinforce interdependence and consume sustainably, it is stated that ECE is well-positioned to accept or adopt these base principles (Didonet, 2008; UNESCO, 2007). The implication is that ESD is a field of study that takes distinct viewpoints, views, and values into consideration (Öhman, 2008). Olsson, Gericke, and Chang Rundgren (2016) believe that a pluralistic approach is required, which Öhman (2008) underscores by stating that when children's knowledge is based on their thoughts and actions, pluralism teaching lifts values and prevents indoctrination. Teachers are role models for kids in supporting and providing sustainability skills and competencies (Hedefalk, Almqvist, & Östman, 2014; Ärlemalm-Hagsér & Sandberg, 2011). Therefore, there is a need for research

that investigates early childhood teachers' perceptions of ESD, and their pedagogical approaches to nurturing sustainability education practices in Swedish preschools as well as how their understanding of ESD connects to their teaching practices.

Swedish educational legislation and policies place a strong emphasis on ESD. It is presented in terms of total societal aims to establish and achieve a sustainable society in the national curriculum (Skolverket, 2011). Sweden is a country with a well-established social system, a strong economy, and sustainable policies for the environment (The Swedish Ministry of the Environment, 2004). The country has included and implemented sustainable development concepts and strategies in all its programs since the United Nations conference on the human environment in Stockholm in 1972. This is clearly stated in educational legislation, curricula, and syllabi (Skolverket, 2011). In Sweden, preschool (förskola) is primarily for children aged one to six. Preschool education in Sweden combines both teaching and caregiving to assist and support children's learning and development throughout their early years (Swedish National Agency for Education, *Lpfö18*, 2018). The preschool curriculum is built on the ideas of care and education, with learning and development happening concurrently. Early childhood education emphasizes play, and Swedish preschool education is frequently cited as a good model of *educare* (Jönsson et al., 2012) due to the way it merges learning with play, as well as the care and nurturing of basic and essential values (Sandberg & Ärlemalm-Hagsér, 2011).

Preschool is responsible for laying the foundation for all children's lifelong learning, according to the Swedish curriculum for preschools. The preschools, in collaboration with the child's home, should assist children in becoming engaged, responsible, and active citizens (Swedish National Agency for Education, *Lpfö18,* 2018). As a result, preschool teachers can create an environment in which children may participate and make their own decisions. Teachers shall have an environmental mindset and provide opportunities for children to develop a caring attitude towards nature and the environment. Additionally, the goal is to set up encouraging learning procedures that increase children's understanding while also motivating their desire to study more, "A sense of exploration, curiosity, and desire to learn should form the foundation for pedagogical activities. These should be based on the child's experiences, interests, needs, and views. The flow of child's thoughts and ideas should be used to create variety in learning" (Ministry of Education and Science, 2006, p. 9).

The first national curriculum for preschools came into force in 1998 when preschools became part of Swedish Education (Skolverket, 1998), and it was revised in 2010. The Swedish preschool curriculum is the official document that specifies and controls the subject matter of preschools in Sweden. As a result, it is what local decision-makers, government employees, practitioners, and parents look to for guidance on what the preschool should entail. The curriculum thus has an impact on the daily lives of Swedish children and their families, as well as on professional practices. In the new Swedish curriculum for preschools (Skolverket, 2018) which came into effect in July 2019, ESD has been specifically defined as an overarching notion under the section, '*Sustainable development, health, and well-being*'. It demonstrates, "Education should give children the opportunity to acquire an ecological and caring approach to their surrounding environment and to nature and society. Children should also be given the opportunity to develop knowledge about how the different choices that people make can contribute to sustainable development -not only economic but also social and environmental" (Swedish National Agency for Education, *Lpfö18*, 2018, p. 9).

Education "should be based on a holistic approach to children and the needs of children, in which care, development, and learning form a whole" (Swedish National Agency for Education, *Lpfö18*, 2018, p. 7). SD is depicted holistically in the curriculum including ecological, social, and economic implications (Borg & Pramling Samuelsson, 2019). Thus, as evidenced by the Ministry of Education and Research's definition of topic content and pedagogical methods in the preschool curriculum, teaching for sustainable development is considered as an essential aspect of the preschools' mission (Ministry of Education and Research, 2010). It states,

> preschool is a natural starting point for this work since the foundations for interests, valuations and knowledge are laid down in these early years […]. Teaching about sustainable development is about holistically integrating environmental issues and also social and economic issues. Care for the environment and rehabilitation, natural resources, sustainable consumption, sustainable production, lifestyle issues addressing consumption and food, health, and the creation of a peaceful society are all examples of principles covered by the concept of teaching sustainable development. (p. 15)

I, as a researcher, am thus interested in examining and understanding the phenomenon of the preschool teachers' perceptions of ESD and their pedagogical practices for fostering ESD practices in young Swedish pre-schoolers, as well as how their perceptions of ESD relate to their teaching approaches by using a phenomenological approach, and Vygotsky's social constructivism theory. The choice to utilize phenomenology is based on various aspects. This phenomenological approach can be viewed as suitable when investigating perceptions via interviews, and when one pursues to describe and comprehend the perceptions without altering them (Dukes, 1984). Patton (2002) states that phenomenology is about elucidating how "participants perceive a phenomenon, describe it, feel about it, judge it, remember it, make sense of it, and talk about it with others" (p. 104). As a result, what is eventually examined is the researcher's interpretation/analysis of others' experiences and perceptions. Moreover, the importance of a phenomenological viewpoint can be emphasized because it is based on the idea that the world cannot be described solely via positivistic research instruments, or viewpoints. Consequently, a phenomenological approach to studying how the notion of ESD is perceived, and how ESD teaching is experienced can be promoted. To accomplish this study, the phenomenon was examined through semi-structured interviews of five preschool teachers to understand their perceptions, and opinions about ESD, and their teaching approaches in nurturing ESD practices in young preschoolers.

Pedagogical/teaching approaches encompass the methods utilized by teachers to enable student learning (Westwood, 2008). Pedagogical approaches and teaching practices are used interchangeably in this study. Teaching/pedagogical approaches are established on theories of learning, such as Vygotsky's social constructivism employed in this study. Vygotsky's social constructivism theory is a means of understanding and interpreting information from participants of a research study as individual learning experiences, processes, and meaning-making are incorporated (Creswell, 2007). This theory proposes a participation model of learning in which the internalization of knowledge is derived through social interaction, and further emphasizes the significance of language, peer work, zone proximal development, scaffolding, and collaboration. Thus, a relationship between the theoretical framework and research methodology of this study provides the window to understanding the teachers' perceptions, and opinions of ESD, and their teaching practices in nurturing ESD in preschools.

The researcher thus, selects Sweden as a research country, since Sweden is considered one of the most sustainable countries on the planet, and one of the leading countries when it comes to integrating ESD in its educational practices (OECD, 2014; Östman & Östman, 2013).

1.1. Research Problem and Relevance

Human activities have affected the planet and have led to a swift trajectory towards hazardous climatic conditions globally, and a severely different biosphere (Steffen et al., 2015). These changes cause multiple effects from global warming, biodiversity loss, etc, and are dangerously close to the sustainable boundaries of the planet and the biosphere (Raworth, 2017). All these are because of unsustainable habits. On their part, young children are impacted by these global challenges and the impacts of these challenges are evident in them. We, consequently, must find ways of living to build a sustainable society. As the need for sustainability becomes more obvious, so does the value and significance of incorporating ESD in early childhood settings and researching into early childhood teachers' perceptions of ESD as well as their teaching methods of nurturing sustainability education practices in preschools. This response to a call for ESD to begin in the early years of education (Davis, 2010; Davis, 2015; Pramling Samuelsson & Kaga, 2008; Pramling Samuelsson, 2011; Wals, 2017), since the primary year's stage is essential for the development of basic mindsets, knowledge, skills, values, and attitudes, and apparently in connecting to sustainability (Pramling Samuelsson & Kaga, 2008). Education, especially in early childhood needs to fuse ESD into its practices, as sustainability has huge ramifications with the objective of supporting change towards a more sustainable future. Early childhood education should thus, engage young children in ESD to create a sustainable planet as ESD attempts to empower "people of all ages to assume responsibility for creating a sustainable future" (UNESCO, 2009). As Kaga (2008) puts it, "education for sustainability must begin in early childhood" (p. 54) because early experiences related to sustainability foster basic life skills such as problem-solving, teamwork, communication, autonomy, and creativity in young children. Early childhood education has progressively been acknowledged as a beneficial ground for ESD (Davis, 2015; Ärlemalm-Hagsér & Pramling Samuelsson, 2018). Also, in Gothenburg Recommendations (2008), researchers such as Davis,

Engdahl, Pramling Samuelsson, Otieno, Siraj-Blatchford, and Valladh (2008) suggest that early childhood education is viewed as a central concern for a sustainable future. The early years are crucial for the development of fundamental skills, knowledge, attitudes, and values, plainly in terms of long-term development. In line with this, Pramling Samuelsson & Kaga (2008), posit that it is in the "early childhood period that children develop their basic values, attitudes, skills, behaviours, and habits, which may be long lasting" (p. 12), and this can be considered as the first step towards an encouraging and sustainable way of life.

Early childhood teachers as implementers and guides of early childhood education thus, play a substantial role in young children's sustainability awareness (Davis, 1998; Elliot, 2010; Wilson, 1996; 2010). Consequently, the perceptions of preschool teachers about ESD, and their approaches to fostering sustainability education practices become crucial because teachers play an important role in developing children's sustainability awareness practices. When preschool teachers share information about cases involving Sustainable Development (SD) and suitably support young children's attitudes and opinions, these youngsters are more likely to take action in the future to ensure a sustainable future (UNESCO, 2005). Preschool teachers, therefore, have a responsibility to play in joining worldwide efforts to handle the challenges and motivate young pre-schoolers to embrace sustainable lives, and young children will conceivably benefit from and enhance their learning possibilities in their learning for sustainability (Wals & Benavot, 2017). The application and teaching practices of ESD in preschools may be limited or even lacking if teachers do not have a comprehensive knowledge of ESD. Therefore, Swedish preschool teachers' perceptions of ESD experiences with children and the processes they establish about sustainability become significant. Thus, undertaking this study on sustainability in early childhood is essential to provoke thinking and discussion on how the early childhood teachers in Sweden encourage and promote sustainability in young pre-schoolers and the approaches they are employing.

1.2. Research Aim and Questions

This study aims to investigate early childhood teachers' perceptions of Education for Sustainable Development (ESD) as well as their teaching strategies for fostering ESD practices

in Swedish preschools, and how teachers' perceptions of ESD relate to their teaching practices. Creswell (2013) states that research questions for a phenomenological approach investigate the meaning of the experience of people and ask individuals to describe their day-to-day lived experiences and events (p. 54). This research will then, be guided by the following questions:

1. How do preschool teachers perceive Education for Sustainable Development in Swedish preschools?
2. What teaching approaches do preschool teachers use in fostering sustainability education practices in young pre-schoolers?
3. How do preschool teachers' perceptions of ESD relate to their pedagogical approaches?

1.3. Organization of the Paper

This study is divided into seven chapters. Chapter 1 establishes the need and basis for this study by including the introduction and background to the study, research problem and relevance; research aim, and questions, and it concludes with the organization of the paper.

Chapter 2 is the review of previous research that focuses on research into pre-school teachers' comprehension of ESD and those that emphasize ESD-linked teaching practices at the level of early childhood education.

In chapter 3, the theoretical framework of the study is discussed.

Chapter 4 is the presentation of the research methodology. It focuses on the qualitative methodology, primarily the phenomenological approach.

Chapter 5 presents the research findings and analysis of themes that emerged from the data.

Chapter 6 is the discussion chapter.

The seventh and final chapter provides a conclusion of the study, reviews the objectives, results, and implications of the research as well as the recommendations for further research.

2. Review of Previous Research

This chapter serves the objective of providing a critical discussion of the current research to give the reader scientific context for the current study. Thus, this review of related literature is to highlight existing research of scholars in the field of ESD in early childhood education precisely research into preschool teachers' understanding of ESD and those that accentuate ESD-related pedagogical practices at the level of early childhood education:

In Ärlemalm-Hagsér and Sandberg (2011) study titled "Sustainable Development in early childhood education: in-service students' comprehension of the concept", teachers underscored the relevance of ESD in pre-school years, when morals and attitudes start to form. They found that the teachers acknowledged the objectives of ESD as the acquisition by children of actions and behavior for sustainable lives. According to them, merely a very small percentage of teachers explained ESD as changing children's behavior for the benefit of a sustainable future. They suggested further studies investigating teachers' perspectives and understanding of ESD.

On the other hand, Pramling Samuelsson's (2011) study explores the young children's willingness or readiness for ESD and underscores that children are sufficient of age to convey ESD concerns because they can experience and acknowledge what is going on in the world (Pramling Samuelsson, 2011, p. 107). Conforming to this, children, according to McKeown (2013), are individuals who must gain and learn skills, knowledge, values, and attitudes, in creating a sustainable planet. Consequently, Education for Sustainable Development in early childhood education should be amenable to children's meaning-making; so, teachers can be effective participants in that process (Engdahl, 2011). Teachers may be unable to practice Education for Sustainable Development concerns in early childhood education settings if they do not possess suitable sustainable development understanding and a positive attitude regarding sustainable development (Boutte, 2008). Knowledge of children's viewpoints can help early childhood teachers present Education for Sustainable Development in a way that is developmentally appropriate and caters to children's conceptions and needs about sustainable development. On this point, educators can enhance students' critical thinking skills, and schools should assist learners in reaching that level of thinking and increasing their consciousness of environmental, economic, and socio-cultural issues (Orr, 1992). According to McKeown

(2002), each discipline and every teacher may further Education for Sustainable Development. Although ESD is currently part of the formal education curriculum, teachers can contribute to totally promote and benefit from the notions of sustainable development.

Green (2013) on the other hand, studied the ESD practices and methods used by preschool teachers. The initial prerequisite and step in guaranteeing teachers' impact and participation in ESD are to ensure that they are familiar with the concept of sustainable development. Knowledge of the ESD concept is crucial, but it is also critical to examine not only what we are teaching young children, but also how we are educating them. Green (2013) outlines six critical practices that assist long-term development via early childhood education in this respect. These are interdependent, developmentally appropriate, meaningful and relevant to children, participatory and problem-based nature of SD, the importance of context, and promote community engagement. Moreover, the significance of SD to young children's lives and community engagement is attempted to satisfy the context's demands. Children's engagement in sustainability-connected activities with teachers and parents was critical for children's awareness of sustainable development, according to Borg, Winberg, and Vinterek (2017). Green (2013) further states that the teachers engaged in ESD activities illustrated the importance of ESD for a sustainable planet and future, as well as how ESD enhances positively to the advancement of young children.

Hedefalk, Almqvist, and Östman (2014) review studies conducted from 1996 to 2013 on ESD and ECE, and they posit that preschool teachers view and regard ESD merely as the teaching of facts connected to the natural environment, and the teachers often involved the children in nature activities and science. Teachers' lack of knowledge of the economic and socio-cultural components of ESD is also described because of their insufficient understanding of the subject. ECESD is not simply about teaching children about environmental, social-economic, or cultural phenomena, according to the findings of their study. They underline two alternative definitions of Education for Sustainable Development; as a three-fold approach to education grounded on questions regarding education about, in, and for the environment; and an approach to education that embraces three interconnected aspects, that is, environmental economic, and social. The researchers sought to determine how teachers perceive ESD, and how it can be applied and implemented in educational processes. Participants' teachers evolve ESD from teaching

children facts about the environment, and sustainability issues to educating children to act for change, according to the study. Similarly, in the study conducted by McNaughton (2012), it is stated that ESD in the pre-school phase promotes children to be well-educated individuals who can make a difference or change in the world and who can make the appropriate decisions for themselves and others. ESD-linked teaching approaches in early childhood, in this perspective, develop and build connections between the present and a sustainable future.

Also, in their study, Dyment, Davis, Nailon, Emery, Getenet, McCrea, and Hill (2014) investigate the impact of professional development on early childhood educators' belief, comprehension, and knowledge of education for sustainability. Pre-school teachers in this study described the goal of Education for Sustainable Development as providing critical thinking/abilities and skills to young pre-schoolers. Their findings also indicated that early childhood teachers had a strong understanding, sense of knowledge, and confidence in the application of sustainability. Qualitative and quantitative questions in their study indicated that early childhood education teachers lacked strong beliefs and practices in Education for Sustainability (EfS). Instead, most of their study participants engaged in environmental education pursuits. The researchers advocated that teachers in both eco and regular classrooms participate in professional development that leads to a holistic understanding of sustainable development and Education for Sustainable Development. They established that teachers' views on ESD appear to influence their educational and teaching practices. The ability and capability of teachers to address sustainability in schools are determined by their knowledge and beliefs about the subject matter and pedagogy, according to Corney and Ried (2007). It is of implication how educators perceive their own understanding about ESD issues, and how they assess their ability to teach the subjects (Borg, Gericke, Höglund & Bergman, 2014).

The above studies have considered educators' understanding of the key concepts and expressions related to the practice and pedagogy of Education for Sustainable Development, its goal, and importance of ESD, etc., with different theories and methodologies, but none have examined Swedish early childhood teachers' perceptions of ESD concurrently with strategies teachers are employing in nurturing sustainability education practices in young Swedish pre-schoolers and how their perceptions of ESD relate their teaching approaches, through a social constructivist perspective. Teachers' understanding/knowledge, skills, and attitudes have an

impact on what young children grasp or learn in Early Childhood Education, and Pramling Samuelsson and Kaga (2008) argue that teachers are critical to the processes and practices because of their significant influences on young children. Thus, when teachers give information on cases involving Sustainable Development to preschool children and support or encourage children's viewpoints and attitudes appropriately, such children will be more likely to take initiative for a sustainable future henceforth (UNESCO, 2005). Thus, there is a gap, or a "research hole" as Davis (2009) puts it, that is needed to fill up. Subsequently, a number of studies have advanced in the field (Bascope et al., 2019; Davis & Elliot, 2014; Green, 2015; Somerville & Williams 2015). This study will thus be distinguished from the aforementioned as it will examine preschool teachers' perceptions of ESD as well as their pedagogical approaches for fostering sustainability education practices in Swedish preschools, and how their perceptions of ESD relate to their teaching practices.

3. Theoretical Framework

Lev Vygotsky's Social Constructivism serves as the theoretical framework for this study. Lev Vygotsky, a Russian teacher, and psychologist proposed a social constructivist theory to emphasize the critical role of language, social context, interaction, and support in learning and cognitive development. Vygotsky's (1978) viewpoint featured a socio-historical dimension stating that a person's knowledge of a human community is derived to a significant extent from social interaction, through which cultural features are learned. Individuals seeking and applying meaning through subjective experiences is the notion behind social constructivism (Yilmaz, 2008). Meaning evolves from both personal experiences and social interaction. All meaningful learning, according to social constructivism, is a process of personal meaning-making based on the individual's cultural knowledge and understanding. Therefore, social constructivism research attempts to understand the perceptions or meaning that participants have given to these experiences. Vygotsky's theory includes several fundamental elements namely, social interactions, Zone of Proximal Development (ZPD), scaffolding, language development, collaborative learning, and mediations.

Social interaction as one of the key elements plays a basic role in the development of cognition. In contrast to Jean Piaget's view of child development, which held that development necessarily precedes learning, Vygotsky promotes the view that learning leads to development. Vygotsky argues that social communication is critical for human cognitive development and psychological capacity, "Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first between people (inter psychological), and then inside the child (intra psychological)" (Vygotsky, 1978, p. 57). Students learn best through social interactions in the classroom (Vygotsky, 1962), and these interactions lead to changes in conceptual understanding, knowledge, and thinking (Dewey, 1938).

The concept of "Zone of Proximal Development" (ZPD) in social constructivism refers to social interaction as a critical process in cognitive development. It is in this crucial area that the most sensitive instruction or guidance should be provided. The ZPD is used to help learners acquire higher mental processes on their own. Children learn from their surroundings and from their interaction with others, according to Vygotsky. The social constructivist theory emphasizes the responsibility of teachers, as teaching is about mentoring learners. Vygotsky believes that the future of learners is dependent on good teacher supervision. Vygotsky defined the term Zone of Proximal Development, as the "distance between a learner's actual development level determined by independent problem solving and the higher-level potential development through problem-solving under trainer guidance or in collaboration with able peers" (Wertsch, 1985, p. 60). In the words of Lantolf (2000), Vygotsky developed this term in such a way that it has come to mean the ability to learn and achieve when acting completely alone versus what can be accomplished when acting with support from someone else or cultural artifacts (p. 17). Within the Zone of Proximal Development, he recommends that teachers use cooperative learning exercises where less capable children improve with the assistance of more capable peers.

Scaffolding is a kind of interaction that takes place in the ZPD. Vygotsky's concept of scaffolding is the principle of setting a learner a task that is currently beyond their experience but within their ZPD, and their providing support- guidance, modeling, hints, so that the learner can achieve with support (Vygotsky, 1978). This support can be provided by more capable peers, and Vygotsky accentuates the implication of combined age grouping of youngsters as

this indicates they can access more knowledgeable peers, and in doing so, the more capable child can act as an aid or a resource for others. Teachers can help to 'scaffold' the thinking needed in others to grasp and comprehend an abstract idea because children do not learn impulsively or automatically. In a scaffolded learning environment, the teacher acts as a facilitator of knowledge rather than the content expert. Thus, the term scaffolding is used to describe certain kinds of support which learners receive from experts and teachers as they develop new skills. Vygotsky underlines the implication of the more experienced other's role in facilitating and assisting learning; in order words, he claims that learners need help/support to attain their goals. Knowledge is therefore constructed, according to Vygotsky, via interaction with others, such as student-student or teacher-student (Powell & Kalina, 2009). Knowledge is thus constructed through scaffolding. Scaffolding is a process of teachers or students helping another student to construct new knowledge.

The learning process is aided by learners' interactions with each other and their surroundings (Vygotsky, 1978). Individuals cooperate on instructional content to generate optimal learning in a social setting making cooperative learning an interesting experience. In addressing the ZPD, the scaffolding process in which students learn on their own and with the support of others is critical to cooperative learning (Slavin, 2006). Through various means, this peer-connected learning allows for cultural collaboration. Students are more engaged when they work together, and the result can be a socially advantageous experience for all, "because peers are usually operating within each other's zones of proximal development, they provide models for each other of slightly more advanced thinking" (Slavin, 2006, p. 45).

The concept of mediation is important to Vygotsky's theory, as he contends that tools and signs mediate human behaviours/actions on both the individual and social levels (Wertsch, 1991). All higher mental functions have social beginnings, which means, they first manifest in the interpersonal interaction before being internalized. Children learn culturally appropriate practices when they witness and engage in the daily lives of their families and communities (Vygotsky, 1978). In these activities, children are encouraged to take part in these activities by their peers with whom they established a shared knowledge.

The connection between language and thought, according to Vygotsky (1978) is particularly significant. He believes that language is the primary form of interaction through which adults transmit to the child the rich body of knowledge that assists withinside the culture. Vygotsky (1978) was particularly interested in language and how it mediated human actions, "the relation between speech and actions is a dynamic one in the course of children's development (p. 27). As children participate in meaningful experiences with more knowledgeable others, there are opportunities for children to internalize the language being used.

I have therefore chosen Vygotsky's social constructivism for this research since it stresses the significance of language, interaction, peer work, ZDP, and collaboration. Vygotsky's social constructivism theory helps to shape the objective of this research and research study. As above mentioned, the aim of this study is to investigate early childhood teachers' perceptions of Education for Sustainable Development (ESD) as well as their teaching strategies for fostering ESD practices in Swedish preschools, and how teachers' perceptions of ESD impact their teaching strategies. The study also aims to contribute to understanding preschool teachers' pedagogical practices relating to ESD. While it helps to frame this study, there are some drawbacks to using one theory to frame a study, such as the theory's lack of emphasis on how individual processes information gained from others. To put it in another way, this theory places less emphasis on individual capabilities and characteristics.

4. Method

This chapter presents how this study was designed and carried out. I used a phenomenological qualitative research design to examine and understand preschool teachers' perceptions of their experiences with young pre-schoolers and the processes they establish towards ESD practices. I selected this qualitative approach because I am interested in capturing the lived experiences, reflections, and opinions of individuals namely, preschool teachers on ESD, regarding how they interpret the phenomena they experienced. Accordingly, the below sections describe research design; data collection which comprises a selection of participants and data collection process; data analysis; validity issues; limitations; and ethical considerations.

4.1. Research Design

Research design serves as a roadmap for answering the research question(s) (Saunders et al., 2016, p. 163), and it provides a structure or framework for collecting and interpreting, and analyzing data (David & Sutton, 2011, p. 163). To answer the research questions of the current study regarding preschool teachers' perceptions of ESD experiences with young pre-schoolers and the teaching approaches they are applying in fostering sustainability education practices, as well as how their perceptions of ESD relate to their teaching approaches, a phenomenological qualitative research design is used. The phenomenological approach is used within the qualitative research tradition to describe how people perceive and experience and make sense of a phenomenon. For this study, the phenomenon is 'teachers' perceptions of ESD and their teaching practices in preschools.

In line with this perspective, open-ended interviews are used to explore preschool teachers' experiences. The empirical phenomenological approach, according to Moustakas (1994) "involves a return to experience in order to obtain comprehensive descriptions that provide the basis for a reflective structural analysis that portrays the essences of the experience" (Moustakas, 1994, p. 13). Correspondingly, "the operative word in phenomenological research is described," writes Groenewald (2004, p. 5), and the researcher's goal is to describe as accurately as possible while avoiding any pre-determined framework and maintaining and remaining true to the facts. The goal of the phenomenologist is to understand social and psychological phenomena from the viewpoints of the people concerned (Groenewald, 2004, p. 5). Semi-structured interviews are used for this purpose in this study to understand preschool teachers' perceptions of their experiences with young pre-schoolers and the approaches they establish to implement ESD practices.

Qualitative studies provide access to a social reality that is incessantly constructed by the participants in it, and it lends itself to gaining a more holistic perspective on peoples' perceptions, ideals, and beliefs within the social context that they inhabit. One of the disadvantages of qualitative research is, it is subjective and interpretative, making it difficult to duplicate. Flexibility in data collection and its analysis limits the generalizability of results. On the other hand, this approach leads to descriptive data, which provides an understanding of the external world through the eyes of the subjects (Moustakas, 1994). I, therefore, use a

phenomenological qualitative research approach because I am interested in capturing the experiences, reflections, and opinions of individuals namely, preschool teachers about ESD practices, and their teaching approaches.

4.2. Participants

The goal of qualitative research is to interpret the common lived experiences of individuals. In order to understand the significant phenomenon of the research, the researcher adheres to a purposeful maximum variation sampling, combined with snowball sampling method. The rationale for using this sampling method is to gain greater insight into a phenomenon by looking at it from different angles. According to Patton (1990), "Information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the research, thus the term purposeful sampling" (p. 169). In selecting the participants, a sample size of the participants needs to be considered. There are no rules for the sample size in qualitative research (Patton, 1990); however, Leedy and Ormrod (2010) propose that the sample size in phenomenological research should range from 5 to 25; as the result are not meant to be generalized to the bigger population (Creswell, 2013). Correspondingly, for phenomenological studies, Creswell (2013) recommends a minimum of five and no greater than 25 individuals who have all experienced the phenomenon of interest, and this will give an appropriate sample size. On the other hand, Morse (1994) proposes a sample size of six. These recommendations assist the researcher to consider the approximate number of participants needed. Qualitative research does not pursue to be generalizable; it is not essential for the sample to be representative of all sorts of people who have experienced the phenomena of interest.

In this study, a total of five preschool teachers from four different preschools in Sweden were identified to participate, through a maximum variation or heterogeneous purposeful sample method following a snowball technique. The first step was to contact a preschool teacher that the researcher knew in the field and having her suggest other teachers who fit the study's description, a process known as purposeful sampling (Creswell, 2013). The teachers are contacted, and they, in turn, suggested more study participants, this is called snowballing

sampling (Creswell, 2013). The researcher hence relied on those initial participants to help identify additional participants for the study. The researcher sent invitation letters to the potential participants (**Appendix 1**), with follow-up phone calls and emails to encourage timely response, and asked for their responses to confirm a willingness to participate. After their response to participate in the study, a letter of information on the study was sent to them (**Appendix 2**); this included the outline of the study as well as the informed consent information. The interviews were scheduled, and they took place at a jointly agreed place, day, and time. Through the means of communicating with prospective participants about research needs, time commitment, and fulfilment of the design study, eight participants gave their consent to the scheduled interviews. During the study, three participants had to withdraw due to various reasons, leaving the study with only five participants. All individual interviews were conducted in person, one-on-one.

Maximum variation provided a diverse range of situations relevant to this study in relation to the phenomenon under examination and provided rich data about early childhood teachers' perceptions of ESD, their teaching approaches, and how their perceptions of ESD relate to their pedagogical approaches. The researcher ensured the sample was heterogeneous in terms of years of experience as early childhood education teachers, and grade level. This diverse sample of participants provided rich data resulting in similarities as well as differences in the data which helped respond to the three research questions. ***Table 1*** shows the demographic information of the preschool teachers in this study:

***Table 1*: Preschool Teachers' Demographic Characteristics**

Participants	Gender	Age	Type of Preschool	Educational level of the teachers	Years of teaching experience	Training in ESD	Grade level
TA1	F	52 years	Municipal	Bachelor's degree+	29 years+	Maybe	4-6 years
TB2	F	54 years	Municipal	Bachelor's degree	10-15 years	Yes	3-6 years
TC3	F	51 years	Municipal	Bachelor's degree+	30 years	Yes	3-6 years
TD4	F	45 years	Municipal	Master's degree	4 years	Yes	6 years
TD5	F	38 years	Municipal	Bachelor's degree+	8-10 years	Yes	4-6 years

4.3. Data Collection

Various data collection techniques can be used to gather the information that will help the researcher better comprehend the phenomenon under study. In phenomenological studies, data are gathered from participants who have direct experience with the phenomenon. Data collection in phenomenological studies comprises in-depth and multiple interviews with participants (Creswell, 2007), and according to Mertens (2005), the "researcher is the instrument" (p. 247). The selection of suitable data collection methods as well as their correct use decreases the likelihood of errors occurring in research. One of the most usual methods employed in data collection is interviews (Bryman, 2016). Interviews provide insight into the persons' lived experiences, and they assist a researcher in realizing how participants make sense of and construct reality concerning the phenomenon (Bryman, 2016). In connection with this, Kvale (1996) states that qualitative interview "attempts to understand the world from the subjects' point of view, to unfold the meaning of peoples' experiences, to uncover their lived world before scientific explanations" (p. 1).

Data collection of this phenomenological study is carried out through individual, and semi-structured interviews. Semi-structured interviews are designed conversations with a pre-determined set of questions (Babbie, 2016). Furthermore, this qualitative study used open-ended questions, which allowed the participants to articulate their perceptions and experiences in a way that a structured questionnaire with planned questions and answers could not (Smith, 2008). All the interviews were done face to face, the researcher established a pleasant rapport with the participants in the process.

A semi-structured interview guide (**Appendix 3**) was used to examine preschool teachers' perceptions, opinions, and experiences of Education for Sustainable Development as well as their pedagogical practices for fostering ESD practices in Swedish preschools, and how teachers' perceptions of ESD relate to their teaching approaches. This guide ensured that relevant questions are covered, and the researcher also used prompts and follow-up questions for deepening and detailing the data. Interviews with the individual participants were conducted in March 2022. The places for the interviews were mutually determined and agreed upon by both the participants and the researcher based on convenience. The interviews were conducted

entirely in English, though some words and phrases in Swedish were used both by the researcher and the participants.

Upon meeting the participants, the researcher spent time talking to the participants before beginning the interview to make them feel comfortable. The researcher provided the introductory information regarding the study and reminded the participants of the informed consent. The interviews followed the structure of the interview guide (**Appendix 3**) which comprised a set of questions divided into two parts. The first part focused on background questions; this served the intent of providing information about the teachers' background, and the second part contains the content questions. The researcher asked the participants demographic questions including the participants' age, educational qualifications, level of education, and years of teaching experience. After the demographic information was obtained, the researcher then started the second part of the interview involving the content questions. The participants were asked a series of questions in a semi-structured interview. The researcher recorded the interviews with the permission of the participants, and the interviews took between 44 mins to 55 mins, but no more than one hour. The audio recording helped the reliability of the interviews and allowed the researcher to review transcribed data while listening to the recorded interviews. The researcher documented nearly one-hour interview for each participant.

4.4. Data Analysis

A qualitative thematic analysis (Braun & Clarke, 2006) was used to code the data and identify the emergent themes on preschool teachers' experiences, perceptions, and opinions of ESD with young preschoolers and the processes they establish about sustainability. Thematic analysis is crucial to phenomenological studies because it emphasizes the subjectivity of individuals' perceptions, feelings, and experiences (Guest et al., 2012). According to Braun and Clarke (2006), thematic analysis can be positioned so that it "reports experiences, meanings and the reality of participants" (p. 81). According to Braun and Clarke (2006), it is "a method for identifying, analyzing, and reporting patterns (themes) within data" (p. 79), like in this study, which aims to identify, describe, and analyze themes that arise in the preschool teachers' perceptions and experiences of ESD and their teaching practices. A theme is an example of code, and as Boyatzis (1998) puts it, it is a pattern uncovered in the data that at minimum explains and categorizes the potential observations and at maximum construes aspects of the

phenomena (p. 4). Boyatzis (1998), further states that themes may be at first produced inductively from the original data or they may be generated deductively from theory and earlier research. According to Burnard et al. (2008), each can be addressed in a variety of ways. Thus, the data in this study is analyzed using inductive thematic analysis methods to focus on the materials and information obtained from the interviews being conducted and developed 'bottom-up' themes. In contrast, deductive, a 'top-down' approach would normally use a more structured interview format and direct participants to answer to particular topics informed by the existing evidence-based knowledge (Braun & Clarke, 2006). A benefit of an inductive method is that it is more receptive to hearing about participants' experiences and perceptions than it is to obtain their opinions on evidence-based topics. This aids to prevent the perpetuation of preconceptions and biases in the literature.

The researcher followed the six steps/phases of thematic analysis identified by Braun and Clarke (2006) which entail familiarisation with the data (reading and rereading transcripts, noting down initial ideas), generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the reports (Braun & Clarke, 2006). After the interviews, the researcher transcribed verbatim the interview sessions of each participant. The researcher read the transcripts numerous times in order to become acquainted with the data to gain a detailed understanding of the participants' reality. By reading and rereading the transcripts line by line and designating a term or phrase that accurately reflected the essence of the information read, the transcripts were initially coded.

This phase "generating initial codes" focuses on reducing the data and the production of initial codes (Braun & Clarke, 2006). Individual coded segments are where the researcher's pattern identification begins, hence code plays a very important function. Individual codes frequently generate a sense of data which then informs how the researcher assigns values to various perceptions and experiences of the participants. In this study, the researcher codes phrases from texts, and individual words because this captures the essence of the participants' experiences, perceptions, and teaching practices of ESD. The data were coded into meanings and manageable chunks of text, such as passages, single words, and quotations (Attride-Stirling, 2001). The goal of coding is to present a summary statement for each element mentioned in the

transcripts. Some of the initial codes generated included: going and taking children to the wood and exposing children to nature in the vicinity, and so on (**Appendix 4**).

Themes are identified by analyzing and sorting the codes. This step "searching for themes" (Braun & Clarke, 2006, p. 87) serves as a rough draft for theme creation and code placement.

Throughout the revision of data, the researcher reviewed the themes to better represent and capture the varied core of the data, that is, the "reviewing themes" phase. The researcher concentrated on refining the draft themes established during the previous phase "searching for themes". The researcher reads through the codes and examines the codes for each theme to see if a consistent pattern has emerged (Braun & Clarke, 2006). If a coherent pattern emerges, the researcher proceeded to the second level of analysis; if codes did not fit, the researcher had to figure out if the theme itself is the problem or the codes and information for that particular theme. The researcher went on to read through the data set to make sure the themes fit in connection with the data. This allows the researcher to see whether there is any additional information that needs to be coded (Braun & Clarke, 2006).

Theme reviewed generate themes that are meaningful units on perceptions and experiences of preschool teachers on ESD. In this step, 'defining and naming themes', the researcher concentrated on defining each theme, identifying and establishing the essence of the theme, and determining what component of the data and research questions the theme belongs to (Braun & Clarke, 2006). The researcher based the themes on the research questions and objectives of this study.

The final step 'producing the reports' centers on data analysis which "goes beyond the description of the data and make an argument in relation to your research questions…" (Braun & Clarke, 2006, p. 93); it also requires "a concise, coherent, logical, non-repetitive and interesting account of the story the data tell-within and across the themes" (Braun & Clarke, 2006, p. 93). Actual sentences and quotations were assigned to pertinent themes which incorporated relevant materials from different interviews. A theme is a word or a phrase that captures something vital or the essence of the data in connection to the research questions as it is because of thematic analysis, (Braun & Clarke, 2006).

Finally, the researcher used SD/ESD in presenting the results because SD and ESD were intertwined in teachers' responses as they referred to both when they share their perceptions and experiences. Therefore, these two concepts were included together in presenting some of the results.

4.5. Credibility

According to Morse (2015), validity illustrates "how well the research represents the actual phenomenon" (p.1213). Hence, validity expands credible studies (Creswell, 2013). Trustworthiness is the fundamental concept in producing effective and credible research results. It has a significant impact on both the researcher and the study project. Trustworthiness consists of credibility, that is, confidence in the truth of the findings (Creswell, 2007). Credibility establishes if the research findings are a correct interpretation of the participants' initial opinions and are based on believable information collected from the participants' original point of view. (Lincoln & Guba, 1985). Credibility is used to check the accuracy of study findings from the perspective of research participants, according to Creswell (2007).

The researcher established credibility in this study by conducting individual interviews with significant participants. Teachers who participated in the interview are included in this study on a voluntary basis. As the researcher conducted her interviews, she ensured that everything run well and that no one was offended or harmed. Member checking was done by having the participants read the transcripts to determine if the ideas that came out during the interview were well maintained, though only three participants out of five accepted. It means that the transcribed data were sent to the participants to check and revise the accuracy of the findings and interpretations. It allowed participants to rectify mistakes, revise wrong interpretations, offer additional information to complete the data, and double-check preliminary findings to ensure that they accurately reflect their experiences and perceptions. Member checking ensures that the study's materials are accurate, and reliable and prevents misinterpretation of the answers of teachers' participants (Ravitch & Carl, 2016). In addition, peer review prepared the researcher for data analysis by posing challenging questions regarding techniques and interpretations/meaning (Lincoln & Guba, 1985). All of these are parallel to Creswell's (2007)

suggestions that member checking and other procedures are important strategies that can be used to confirm credibility in any phenomenological study. However, the methods used to get at the results, conclusions, and comments were clearly described in detail to ensure validity in the study.

4.6. Limitation of the Study

There are only five potential participants in the study, and the sample size limited the amount of information gathered. The materials could therefore not be generalized. By increasing the number of participants, more comprehensive and generalized results can be acquired. The interviews involve only participants from preschools in Stockholm, though with different Municipalities, limiting the research to a select group of participants. A further limitation of this study is a lack of variance in gender. Only female participants give their consent to participate in the study.

Another limitation is language switching. During the interview, there is occasional language switching from English to Swedish which may lead to inaccuracy. The mother tongue of most of the interviewees is Swedish, so many Swedish words and phrases are used during the interview. Though the interviewer knows Swedish to some extent, but these inaccuracies could mainly be considered.

4.7. Ethical Considerations

Ethical concerns are important, particularly when conducting an interview. Ethics are thus, consider a constituent component of good research (Clarke & Creswell, 2008). During the design and implementation of this study, consideration was given to several key ethical issues as indicated by Byrman (2012) and Creswell (2013). These entail responsibilities to participants such as gaining participants' consent, ensuring confidentiality and privacy of the participants, informing the participants about their right to withdraw, and anonymity. This research consequently follows codes and regulations of "Good Research Practice" (Vetenskaprådet, 2017), regarding the informed consent of participants, maintenance of confidentiality, and the

use of information for the study. This research depends on others, in this case, the pre-school teachers, and they are considered in this research. The teachers were informed of the aims, design, and methods of the research. They get the information about the study through a detailed information email letter that was sent to them earlier in the data collection (**Appendices 1 and 2**) and these were highlighted also on the interview day. All potential participants provided their informed consent to participate in the study. It is stressed that their participation is completely voluntary, and they (participants) could withdraw their participation at any time without giving reasons. Moreover, participants are informed that the data collected for this study are used only for research purposes. All the participants were assigned pseudonyms to maintain confidentiality such as TA1, TB2, TC3, TD4, and TE5. This is used for the participants to ethically protect the real names in the data analysis and presenting findings. Only the researcher has access to the participants' names. Ethical considerations are part of the research work and cannot be circumvented (Clarke & Creswell, 2008; Kara, 2017).

5. Results

The results are presented through two themes that emerged in the thematic content analysis of the interview data: preschool teachers' perceptions of Sustainable Development and Education for Sustainable Development; and the teaching practices preschool teachers use in fostering sustainable education practices in preschools. A summary of the results is also offered at the end of this chapter.

5.1. Preschool Teachers' Perceptions of Sustainable Development (SD) and Education for Sustainable Development (ESD)

The results show that preschool teachers perceive that SD is complex, and they have both similar and differing perceptions of SD and ESD.

5.1.1. SD as Environmental Responsibility

Teachers perceive Sustainable Development as "environmental responsibility" highlighting the impact of environmental changes on values such as environmental respect, reconnecting with/to nature, recycling, eating better by reducing pesticides. One of the teachers (TB2) states,

> we get to be near nature, to respect nature… then we have recycling line, where we should take care of different materials, how we should respect how to take care of things, how to renew them. (TB2).

TB2's perspective illuminates the fact that it is our responsibility to take care of and protect the environment and we need to recognize that our environmental activities have a key impact. In our daily actions, we influence our surroundings for example in how we do garbage sorting, recycling, energy consumption, the use of water, and so on. Furthermore, TB2 asserts that doing all these will sustain our natural environment in both the short and long term.

Similarly, TC3 also emphasizes the importance of "not throwing things in nature, and how to work with these things matters". This corresponds to TA1's response as she states, "for me, it is fostering respect when it comes to nature, … to make use of nature that exists in the vicinity, sort of neighbourhood". TA1 further gives an example that Sweden "obviously has a close relationship to nature" and in line with this, she mentions that when one hears about sustainable development, the focus is more on the environment. For TE5, "everything that is chemicals, plastic must be avoided" to protect the environment.

In the course of the interviews, preschool teachers were also asked about the essential concepts, principles, and dispositions that are critical in defining and promoting SD. The dominance of environmental issues in SD was evident as most of the preschool teachers mentions environmental awareness, and responsibility (TA1, TB2, TC3, TD4), "not using harmful plastics" (TE5), waste management, and the need for recycling/reuse to avoid destroying the environment (TB2, TC3, TE5), being near to nature, respecting nature, natural resources use (TA1, TB2, TC3), going to the wood (TA1, TB2, TB3, TD4) energy control, usage of water (TC3, TB2), all to sustain our surrounding for future generations.

5.1.2. SD/ESD as an Integration of Environmental, Social, and Economic Issues

Apart from the theme of environmental responsibility, four of the teacher participants emphasize the connections of economic, social, and environmental factors in their understanding of the concept SD/ESD as it has a varied range of meanings. The four interviewees recognize that these three are intertwined and must thus be handled in tandem. If one of the three aspects is disregarded, it could threaten the accomplishment of sustainable development practices. SD/ESD issues are complex as they bring together the relationship between environmental, economic, and social aspects. TB2 states that SD/ESD:

> has diverse meanings and is split in three different ways. You can see one's social, one's economic, and one's ecological. In the sense that social is how for example, we've been working with FN:s barnkonvention [UN convention on the rights of the child] … we've been working with these books on how you've got to respect thing, and people and you've got to respect yourself and your wellbeing as a person too. Then you have that economical dimension that will be more on recycling, take care of things, you can give to the next person instead of just throwing it away. And the ecological is the way you can plant, how to respect nature, how we grow things in that sense. And these are like I said, linked together. And these need to be handled to provide a balance. (TB2)

SD/ESD entails a jointly sustaining connection based on the integration of environmental, social, and economic factors for both short and long-term prosperity. TB2 response seems to describe that there are linkages and these need to be managed to provide a sustainable outcome. Another participant TA1 thinks more of the environmental aspect of SD than social, and economic components, though according to her these are interlinked, and they are complex and need to provide an understanding of the issues involved and the connection between them. She states:

> I think nature more than the social and economic factors, but of course, it's all of it. And the social factors that enable a good education also enables an individual throughout life to choose and to somehow contribute in enabling sustainability

> focused on environmental and economic issues. These interrelate and need to provide comprehension of things concerned for a more sustainable world. (TA1)

Correspondingly, TC3 indicates that:

> it is not only sometimes people think it's only to pick up garbage and things like that, but it's also to take care of your own body and respect others. And of course, the materials to fix things not only to buy the new ones. So, it's like a more global sight of it, and need to be handled together to achieve a better society. (TC3)

In addition, TE5 perceives SD/ESD as broad and multidimensional and recognizes the mutuality of economic, social, and environmental facets of SD. She states:

> everything that is chemical, plastics should be avoided, everything has to be ecological, that is one concept. Apart from this, making use of the same thing over and over again is another, and the other concerns well-being and relationship with one another. All these go together for a better future. (TE5)

TE5 furthers and mentions cultural diversity in her response as an element that contributes to social, economic, and environmental protection, "kids from different backgrounds, cultural backgrounds, and religious backgrounds to be able to understand them and not to judge them… which is important because that's what we need, and we have a lot of immigrants here in Sweden…" (TE5). Cultural history, diverse kinds of artistic expression, traditions, local values, and behaviors are all elements to contribute the social, economic development, and environmental conservation.

All of these are contrary to participant TD4's description, as she does not link the social, economic, and environmental factors of sustainable development, rather TD4 focuses in describing ESD only on the environmental aspects of going to wood, caring, and respecting the environment.

5.1.3. SD as a Means of Minimizing Carbon Footprint

TE5 perceives SD as a broad issue. Every decision we make counts and can help us reduce our carbon footprints. We all need to change our habits and consumption patterns. TE5 indicates in

one of her responses when asked about her perception of SD, “This is something that should be a lifestyle. You see the mess we have done on our environment. So, it should not just be a topic to discuss. For me, sustainability is a lifestyle”. TE5 argues that all of us require a shift in our lifestyle as well as a change in the way we act. She states, “I try to take care of nature, but I’m doing my little bit and I do educate my daughters and that’s what I do at preschool too, it’s very important to change our lifestyle”. Furthermore, TE5 mentions Greta Thunberg, a young Swedish environmental activist as an example and symbol of sustainability, as she states:

> Greta Thunberg has become a symbol of sustainability, at least when Swedish kids are concerned”. For example, ‘återvinning’ [recycle],…how can we live a lifestyle that is ‘hållbart’ [sustainable] basically …for example the usage of water, why should I not be wasting water, for example, what kind of fuel is being used in the car? Is it a good fuel? What kind of environmental impact does it have? Can we use clothes that can maybe go back to nature or somebody else can use? (TE5)

On the other hand, TB2 explains her understanding of SD as, “things we do automatically, this is something I believe we always do in our everyday activities… a lifestyle, What are we doing to make sure we have clean environment…”. In line with this TA1 states: “even if large parts of what we do are taken for granted, our daily lives and the impacts it has on nature matters”. There is thus, a link between our everyday life, practices, and sustainability.

5.1.4. ESD as a Lifelong Process

Education is an essential tool in achieving sustainable development. Thus, ESD is perceived as an important and lifelong process beginning from the early years to adulthood for a sustainable future. During the interviews, preschool teachers express that ESD is a critical and lifelong process to start in the early years. TE5 states that,

> most of what we are consuming at the moment is not environmentally friendly. Everything from solar lamps, from electric cars, everything needs to be re-evaluated and brought into focus, especially in front of kids, because that’s something that begins early and it is still a love of environment and they, you know, nature and

> using the right materials and using just sustainable future for our kids, we need to bring it up when they are going through early years of preschool already. (TE5)

On the other hand, TB2 states:

> And to understand that you have to throw rubbish. That means it won't disappear. Yes, we have to take care of the things we have. And if we do not with our younger people…What would they learn when they are older? That's why you have to start when they're young. (TB2)

TC3 similarly states that starting with this education beginning at the preschool appears to have a high positive impact and they can significantly shape future success and abilities. "it's going to make like put a base to make them grow up to responsible adults of the future, to have a good ground to stand on and to take care of nature, take care of their own bodies…" (TC3).

The preschool teachers also reveal that ESD helps to educate people for a sustainable future. Some representatives' statements from the interviews are quoted below:

> to make children's senses more informative about not throwing things in nature in order to preserve the environment for a sustainable future. (TC3)
> they grow up as mature adults in the future and take care of nature. (TB2)
> it should comprise the features of a sustainable future generation, based on what we have today, for future generations. (TD4)
> how do we utilize today's resources so that those following us can enjoy the quality of life after us? (TA1)

It is noteworthy that the common emphasis in the expression of the teachers above is that ESD is a lifelong process, and it educates people and encourages changes in knowledge for a sustainable future. Thus, it is good to begin at an early stage in life rather than at an older age because the earlier they start learning skills, the likelihood of future success and development increases.

5.1.5. ESD as a Source of Environmental Awareness and Behaviour

Some of the preschool teachers' comments refer to ESD as a source of environmental awareness and long-term resources: TD4 confirms in her statement,

> is part of it, for example, caring of the environment is included into every aspect of the daily activities of the preschoolers, we decorated the classroom with images of tree branches, kottarna [pinecones], fjädrar [feathers], animals, bird's nest, insects, sand, grasses, pictures of polar animals, seashell, world maps. One corner can represent a forest, the other corner can represent a sea, and so on. (TD4)

These have a significant contribution in raising children's environmental awareness. Another participant (TC3) echoes similar comments when she states that ESD "helps a lot, as it is a source of awareness of the environment, the kids, for example, scrape the leftover foods off the dishes into a compost container, and know that it will form a *gödsel* [manure] to be used in our garden" (TC3). "The children also learn and know about the impact of plastic pollution on the environment by participating in 'garbage lady drama' for example in our preschool" (TB2). This is mirrored in TE5's comments when she highlighted that "All these activities we are doing with the kids, for example, going to the wood, watering our garden, picking trash, recycling… make them be conscious of the surroundings they live in, take care of it and use what they have wisely". In these excerpts above, taken as a whole, teachers indicated that ESD is significant in increasing awareness of the environment which leads to sustainable environment and behaviour change.

5.1.6. ESD as Skills-based Education to Maintain Life for Future Generation

ESD helps one to respond to interaction in their environment on concerns of respect, fairness, and solidarity, like the ongoing war in Ukraine. It helps to encourage problem-solving skills and critical thinking. One of the teachers (TE5) explains critical thinking as involving posing deeper questions about the society we live in and reacting to them in ways that demonstrate how social, economic, and cultural processes might be changed to achieve sustainability "children ask didactic and critical questions" during different activities. In ESD, such

questioning occurs through interactions with teachers, and peers, through plays, by using exercises such as games, and also through the use of technology. TD4 believes that allowing the children to use blue bots helps in boosting their individual skills "I make use of technology, for example, blue bots, and children use it in problem-solving, mathematics, logical thinking" (TD4). She further said, "During games and play, the children use a lot of materials that help their skills" (TD4). Similarly, TE5 remarked, "All the materials we use in our preschool here help our kids a lot, they ask a lot of questions, they do some reflections, they do it by themselves, they do it with their fellow kids, many, many things happen" (TE5). In TB2's explanation, she comments that teaching the children at this age provides them with skills, and "I will take you around the school after the interview if you have extra time so that you see what I have explained to you..." (TB2). These comments have important implications for challenging one's assumed knowledge and questioning one's current thinking and creating spaces that promote the development of life skills is vital in preschools.

5.2. Teachers' Approaches in Nurturing Sustainability Education Practices in Preschools

The preschool teachers presented their pedagogical practices in nurturing ESD practices in preschools. The findings are presented in seven emerging themes:

5.2.1. Taking Children Outdoors

Going to the wood, birdwatching, visiting the garden, and observing animals they see on the way, are all activities children do when spending time in nature and outdoors, assert the teacher participants. According to TB2, introducing children to the diversity of environments from distinct species to various landscapes and climates help them to develop a respect for the world around them and a better understanding of their place within it,

> children have to be able to get near to nature. As I said in the beginning, they have to understand nature. That means you have to invite them to see exactly. Yes, seeds to grow, for example, potatoes, what's going to happen, what do we need to do?

> When we are harvesting some children have a count at the end, how many potatoes have I grown, some count 20, some 35, so we do it as a funny thing. So, these are the kind of things we do automatically. (TB2)

TB2 further states "if we do not show them nature, that means they don't and will not have that connection with nature. That's how I teach them" (TB2). Similarly, TA1 argues:

> when I, as a preschool teacher take the children to a wooded area or playground, I make sure that the children are exposed to words that describe the environment. Some of those words wouldn't be used unless you are in place. So, it expands vocabulary, expands your understanding of the world around you, the world around the children. It's important when it comes to outings, they get more physical variations of movement, so lots of things are interlinked. (TA1)

Nature-based learning helps children develop critical thinking skills. All the children's senses are stimulated as they play outside, guided by their imagination as they touch grass or snow, smell flowers, see the birds or animals, and taste the snow. As a result, playing in nature can stimulate more senses. In relation to nature-based learning, one participant (TD4) says "The children's reactions can be really, really be quite strong when we are outdoors with them playing or doing one thing or the other" According to the participants, nature creates a unique sense of wonder for children. Natural phenomena that occur in the natural environment every day make children awe of the earth and its life, TD4 in addition states that "it is important that children connect with the outside world because it opens their imagination…". TE5 adds, that the setting of activity spaces and learning environments with nature in focus exposes the children too "one day we are walking in the forest, a child called me and said *tittar* [see] showing me a tiny insect, that he has seen before" (TE5). Activities at preschools are inspired by nature and scientific exploration, outdoor activities, and walks in the woods and forests, TC3 states that "it is important that children connect with nature, though it is overlooked in our today's world" (TC3).

It is understood from the interviews that taking children to nature and the outdoors is used for learning where various pedagogical methods are used to encourage children to learn about nature and experience nature, for instance, sensory exploration, to experience nature with all

the senses. Going outdoors and in nature is mediated through play and teaching characterized by exploration. Children learn by having fun, playing, and fantasizing about the plants and animals they see in nature during their outdoor activities and visits to their natural environment. Children develop their own appreciation for nature, and over time, an acknowledgment that these areas are worth preserving by allowing them to identify with their surroundings.

5.2.2. Scaffolding

Other than taking the children outdoors and spending time in nature, the teachers also refer to scaffolding instructions as an approach for nurturing ESD practices in preschool. There are a variety of scaffolding combinations and tools that incorporate teachers or the use of technology to help pre-schoolers achieve a deeper understanding than they would if they worked alone. Participant TE5 states,

> like giving them knowledge, not feeding them knowledge instead, having a discussion. What do you think? And they don't have to come up with the right answers. What I'm interested is their reasoning? How are they reasoning, even if it's wrong, it doesn't matter … so I engage them in the discussion, instead of yes and no questions. (TE5)

> I choose a certain activity, for example. I give them different choices, and I observe them, and their various interest before I throw different choices at them, then they will choose something and make their choices ... and then I start engaging the kids. What? What is your idea? What are your questions? That's where the children lead, and the teacher facilitates. Or I use didactic f*råg*or [questions] like *vad* [what], *hur* [how] *varför* [why] to support the children during the activity. (TE5)

TE5 helps them develop new skills, using scaffolding techniques to build on what they have already known. Other teachers say that they respect and follow children's interests by engaging them in different ESD activities, doing the activities with children in groups, and scaffolding the language for the children. For example, TD4 states "I try to respect the children's interest … As the children have enthusiasm and interest, I can't bring them something to the table that they don't have interest in. I have to concentrate on every child's interest both inside and outside

classroom activities to support their learning" (TD4). She gives an example in her classroom where they use Apps to teach and scaffold the children's reading, she said "We use iPads, we use Apps, audiobooks to support the children who are experiencing difficulty in reading, spelling, and writing. Also, when we have Swedish, we play a lot with words, you know teaching and learning occurs from children's play, we read out loud so that they can experience reading or spelling that way" (TD4), it is a fantastic means to get children thinking while having fun. Technology is used for a wide range of reasons, such as the use of iPads and tablets in supporting children's learning. Also, using visual aids, for example, TB2 expresses that "I usually provide the kids with a magnifying glass to see tiny organisms when they go to the forest exploring their natural environment". This is in accordance with what TC3 said: "sometimes when the kids are playing, I observed them and bring in more materials that support their play". According to TA1, "Most activities in preschools don't look like a typical lesson. I enjoyed children matching books with the topic. I mean basic picture books about forest animals. It would include a song about seasons, perhaps a song with movements. Engaging and supporting the kids with these activities gets them excited about doing and learning" (TA1). TD4 adds that "sometimes, I get a small group to do a game first, like a game that the children do not know, demonstrating to children what you mean and in turn showing the others how to do it, that is I do it first, then together and then I allowed and watched them to do it on their own". The teachers set up a situation but enable children's own interests to guide the learning, the children choose what they do. The quotations and citations above are indicative that supporting the learner through scaffolding starts with what is familiar to them and builds to concepts furthest from their experience.

5.2.3. Hands-on Participatory Activities

Preschool teachers further stated another approach to aid in nurturing ESD practices in young pre-schoolers, providing opportunities and engaging children in hands-on activities, exploration, and participatory practices. The process encompasses experimentation and explorations which is based on children's interests or group interests, and the children's curiosity is encouraged. This corresponds to what TD4 stated, "you know that different kids

need different approaches, and we make sure we provide activities that capture their various concerns, for project works, explorations…" When TA1 was asked to share the approaches she uses in her teaching, one thing she said is, "when you're at the age of one to five, it's hands-on quite often. It's hands-on materials that enable the child to at least initially take interest. You have its materials, but you sort of bring out, and depending on the topic, the materials obviously connect to what you want to focus on" (TA1). TA1 further explains and gives an example of when the kids did hands-on activities "Like when we harvested carrots, and a child asked, can we eat this? It's a hands-on interest in the soil, and there is a sort of understanding of what happened, what happens to the seed when taken care of…for children it creates a reflection… how the food comes on our tables" (TA1). Doing a garden with children, and growing a plant from seed to maturity, checking on the plants' progress can help promote fine motor skills and it is a way to teach children about the natural world.

TB2 shares that, "we had a project with the kids, on the PH of the water, the documentation and photos are pasted on the wall…". Furthermore, TC3 shares her experiences, and she states, "the projects we undertook encourage the use of different senses". It is about teaching children how to be creative, empowered, and optimistic about the future by using hands-on investigations to learn about the environment. TD4 remarked that curiosity, reasoning, fantasy, and imagination are all important parts of children's learning process throughout the project work. "we go along with them by being engaged and observant and advancing procedures that let the children to become active explorers by asking questions to them" (TD4). TB2, TC3, and TD4 give examples of how they engaged in projects with children in their preschools. According to them, they spent a significant amount of time to project work in which the children engage and explore with a variety of materials and use their creativity, and imagination to investigate topics such as science, mathematics, and so on. These projects are often documented, displayed, and pasted on the school. The excerpts below are indicative:

> We do experiments with children, and they try different ways of finding results, such as, … guessing what will take place when two colors are mixed, and after that observing the results. (TD4)

> The kids built a spaceship, they built with empty milk cartons with silver tape and other materials. It took a long time. So, we got mathematics into it as we counted the milk cartons used in it. They did a fantastic job. (TC3)
>
> We have had many projects with children, where they participated and were engaged. (TB2)
>
> The children pick berries, and mushrooms when we go to the *skogen* (forest). (TC3)

In this kind of teaching practice, interactions with each other, the environment, in addition with the use of many languages are involved. During these hands-on activities, the children are curious as they interact, observe, explore, play, create, and reflect. These results show that documentation and displays of the projects are used to share learning with the children, and it supports children's reflection upon the learning process rather than an 'end' product.

5.2.4. Collaborative Teaching and Group Work Activities

Another interesting finding is the teachers' using collaborative teaching style by the use of activities such as playing in groups, group work, the use of songs, and rhymes, and the use of practical experiences in contexts such as gardening, and cooking. TE5 expresses that,

> We always allocate them in smaller groups because certain kids have different needs and certain kids may learn by hearing, speaking, certain kids by writing, and you know they take information differently, and we have already identified what kids can be paired with, which kids without discriminating them of course, but smaller groups of three to four at a time. Not a big group. Or sometimes when we have our circle time, we have a big group also, but that's more like a general information group that we're not working on specific standards. But if you have an activity and we want all kids to have that activity, we have to divide them in smaller groups. (TE5)

Collaborative teaching strategies work in different learning settings such as promoting interactive activities, incorporating books about teamwork at storytime, improving tolerance,

empathy, and inclusion, for language development and communication, and when the kids are playing games. TD4 reveals that “sometimes kids are paired, and they work in groups and at times as a class in a circle form” When asked the kind of activities the children do when they are paired in smaller groups or as a class as a whole, TD4 continues and provides examples activities of how the children work together in groups both indoors and outdoors activities which promote children’s love on the environment, social skills, and language skills, she highlighted: “a whole class sings together with their hands, heads, legs, … with different gestures,” (TD4). TD4 further indicates that sometimes when she was with smaller kids of 2-3 years, the whole group of children in her class sit and watch pedagogical rhymes in a film “I put it for children to watch together like ‘alfabet låt för barn’ [alphabet songs for kids], and the children individually or as a group “play with letters” (TD4), and these promote children’s skills. Rhyming makes kids hear the sounds and syllables in words.

On the other hand, when asked what activities the children do when the children are split into pairs, TA1 states, “matching of pictures about forest animals, coloring a desert scene, that the children found interesting, and they do it in a fun way” (TA1), and this kind of activity allows the children to be hands-on in their learning. TA1, TB2, TE5, and TD4 identify and believe that when children are working in groups, it makes the kids learn how to take responsibility, promote interaction and play with others, improve cooperation, and resolve conflicts.

5.2.5. Play

Interaction and play are facilitated “when children are working in groups, play is one approach that I use too” (TA1). She continues “children spent time doing fun activities such as rhyming, singing, …”. Circle-time activities are highlighted as opportunities for interactive activities such as “storytelling, rhymes, singing together with signs, movements, and actions, and other things” (TA1). Using expressive language to sing, and discuss objects, actions, and emotions plays a big role in children’s learning. Applying language facilitates children having meaningful interaction with those around them. Language is tied to our thoughts and the way we perceive our world. TD4 remarks that “learning through play when they are in groups is important, and I teach them through playing games in groups” (TD4). According to TE5, the kids can play in

groups or individually, sometimes I spread some materials and the children are free to make choices on the materials they want to play with, be it toys, blocks, …" (TE5), and it is more of children directed. According to the teachers, children benefit from hearing varied perspectives.

5.2.6. Engagement of Children in Close and Larger Community Contexts

A further essential theme that emerged in response to the questions concerning the teaching approaches is engaging children with their neighbourhood and the involvement of parents in children's learning. In preschools, children are encouraged to go out into their locality to talk, touch, see and smell so that they can wonder about their reality and surroundings as one of the participants (TC3) indicated. "we visit Vattenfall… in our vicinity, the children interact with those working there …. There in the Vattenfall …, the children were taken around and they learn a lot about recycling and reuse which is good for the environment and society. They provide the children with some sort of local materials the children use during play, project activities..." (TC3). Such encounters engage all of the senses and allow pre-schoolers to get immersed in their surroundings. As TB2 states "sometimes, when we are walking around our neighbourhood, we see beggars, and there is one time during a walk, a child picked a 'pant' [empty can] on the way and give it to a beggar". Children learn to cultivate feelings of care and empathy by developing a link with their community. According to TD4 "I usually take the children to the wood area, to the river and other places nearby our school, and the kids are familiar with all these places, and sometimes some children will be asking me if we go to the stream today …". TD4 continue to comment and said, "when we walk round the 'centrum' [city center] with the children, you will see how children will be pointing to 'affärer' [shops] in the 'centrum'... they like it…," Acquainting children with their vicinity is of importance, as it allows them to sustain that area's benefits, such as cultures, local products, and so on.

According to TD4, in preschool, we "bring together diverse methods of practices which captures the children's many different interests, and one of these is the engagement of the parents into their children's learning" TD4 adds that "like when the children want to construct and needs materials like empty cartons of milk, items from different cultures as we have diversity in the classroom, in preparation for activities, if we do not have sufficient, we may

ask the parents to bring stuff like these if they can" (TD4). TC3 remarked "We build like a bridge with the parents, we treat them with respect". Parents' engagements are as well obvious in their everyday discussions with the teachers about their kids' needs, progress, and desires, which fosters openness. Both physical and digital communication is the means the teacher uses to communicate and dialogue with the kids' parents, as recounted TE5, and TD4. A sense of safety and security is built via contact with the parents of the children, which allows them to express opinions, ask questions, and believe that they have the chance and ability to impact their kids' learning. Parents have an important role when it comes to their children's development.

5.2.7. Making Use of the Swedish Preschool Curriculum

Another theme that emerges from the coding is the use of the Swedish curriculum for preschools. All the teacher participants refer to the curriculum, as a significant plan and structure for what is crucial in teaching and learning. As it as well supports in the clarification and materialization of the learning content. Here are the teachers' remarks regarding making use of the curriculum in preschools with regard to ESD practices:

> The curriculum provides us on what to do rather than how to do it. (TD4)
>
> we try to whatever project we do, we try to get all the different areas from the läroplan (curriculum) into it. And this is important of course …. it is our biggest guidance in our teaching and we will go back often and read and see if this is right thing … (TC3)
>
> I think it's like an umbrella. We can take guidance from it, and we can definitely take inspiration from it. It's not like a law, you know, you're not supposed to follow it through and through. It's there as a guiding tool. (TE5)
>
> it guides my teaching of course, but quite often, in reality, it's up to teachers to see how to carry it out. (TA1)

5.3. Results on the Relations between Understandings and Approaches for Promoting ESD

In line with the third research question of this study, "How do the teachers' perceptions and experiences of ESD relate to their pedagogical approaches?", the results of the first two research questions are summarized below and the relations between perceptions and approaches are discussed. As presented in an earlier section in this chapter, the preschool teachers' perceptions of SD/ESD address six themes: SD as environmental responsibility, SD/ESD as integration of environmental, social, and economic components, SD as a means of minimizing carbon footprint, ESD as a lifelong process, and ESD as skilled-based education to maintain life for future generation. The approaches they reported involved seven thematic areas: taking children outdoors, scaffolding, hand-on participatory activities, collaborative teaching and group activities, play, engagement of children in close and larger community contexts, and making use of Swedish preschool curriculum.

One overall result of this study in line with these thematic areas is that the preschool teachers are familiar with the concept of SD/ESD. It is part of their day-to-day considerations in their regular educational teaching and learning. The SD/ESD perceptions of the teachers influence the strategies they employ in nurturing ESD practices in preschools, for example, the teachers commented on their understanding of SD/ESD in regard to the environment, as already highlighted above, *not using harmful plastics* (TE5), *waste management, the need for recycling/reuse to avoid destroying the environment* (TB2, TC3, TE5), *being near to nature, respecting nature, natural resources use* (TA1, TB2, TC3), *going to the wood*" (TA1, TB2, TB3, TD4). Teachers relate SD as environmental responsibility, lifestyle, and so on, and these are featured in their description of ESD. They described ESD in terms of a source of environmental awareness and behaviour change, a similar situation was observed in the teachers' pedagogical approaches where most of the teachers commented more on the ecological aspect of ESD, and some aspects of the social dimension.

Most of the teacher participants have a holistic understanding of ESD involving the interconnection between social, environmental, and economic dimensions in their understanding of the concept, and consider that these three must not be separated, but this was

not evident during our discussion in their pedagogical approaches. The environmental and social aspects are more included in their remarks when explaining their teaching approaches, and more emphasis is laid on the environmental dimension of ESD by some of the teachers. Thus, the preschool teachers' perceptions of SD/ESD influence their teaching approaches. The preschool teachers depict their activities with the children as a combination of both outdoor and indoor learning with led teaching activities, hands-on and project works, play, participatory activities, group works, and others.

6. Discussion

This chapter presents a discussion of the finding in relation to the research questions, conceptual, and theoretical lenses, and previous research.

One overall result of the study is that teachers are acquainted with the SD/ESD concept and consider it on daily basis as part of their regular educational teaching. The findings show that most of the teachers' participants (TB2, TA1, TE5, and TC3) perceive the three dimensions of SD/ESD namely, ecological, social, and economic aspects in relation to each other. This aligns with the previous research, for example, Corney and Ried (2007) contend that ESD should focus on the various elements of SD and how they are interrelated. Additionally, SD is a wide-range and multidimensional concept, as it entails and considers the integration of economic, environmental, and social components (Davis, 2010; Sandell et al., 2005). Also, according to Borg & Pramling Samuelsson (2019), sustainable development is portrayed holistically in the Swedish preschool curriculum involving social, ecological, and economic importance. But the environmental and social components are the major prevalent notion in the preschool teachers' responses, and these repeatedly come up when they express their perceptions of SD/ESD concerns and during our interview discussion on their teaching approaches to fostering ESD practices in preschools. Still, some teachers' remarks are limited to environmental concerns and the need to protect and respect and care for the natural environment. This highlights the fact that SD/ESD is comprehensive and encompassing and the term is ambiguous (Bolis et al., 2014; Jickling & Wals, 2008), and can be interpreted in various ways, and its application in education results in a wide diversity of teaching goals and methodologies.

The results of the study also reveal that the teachers perceive ESD as a lifelong process starting from early years and for a sustainable future. This result supports the suggestion that ESD must start from early childhood, and it aligns with what some other scholars have demonstrated in their studies (Davis, 2010, 2015; McKeown, 2002; Pramling Samuelsson, 2011; Pramling Samuelsson & Kaga, 2008; The Gothenburg Recommendations on Education for Sustainable Development, 2008; Wals, 2007; Wilson, 2000). The early stage is necessary for the advance of basic approaches, attitudes, values, knowledge, and skills, and seemingly in involving to SD (Pramling Samuelsson & Kaga, 2008); education, particularly in preschools must engage ESD in its practices, as sustainability has far-reaching implications for promoting change towards a more sustainable future. Since ESD is a lifelong process, the process of learning needs to begin at an early age, Pramling Samuelsson (2011) argues that it can be "both content (the object of learning) and a way of working with children (the act of learning) in the early years" (Pramling Samuelsson, 2011, p.103). The preschool teachers demonstrate as well in their understanding of the term that, ESD is substantial in improving knowledge of the environment which leads to sustainable environment and behavior change. They emphasize that awareness leads to behavior change. This corresponds with the UNESCO, (2014; 2015a) recommendations. This also supports the suggestions that transforming our behaviour, unsustainable practices, and habits are needed to fight the mess we have in our world today (Wals, 2007; 2012).

According to the findings of the study, the preschool teachers perceive ESD as environmental awareness and environmental responsibility, and in one of their approaches in nurturing ESD practices in preschool, most of them assert that one of their approaches is taking children outdoors. The teachers engage the children in their natural environment where the children make use of their different senses. As one of the participants (TB2) highlights that establishing the kids with the multiplicity of the natural environments from several species to a variety of backgrounds and climates assists the children to heighten respect for the world around them and a better awareness of their place in it. These practices provide the young pre-schoolers with an authentic ecological opportunity by allowing them to be in nature, lost in their play, and gardening to maintain the plants. This correlates with the idea in the previous research, where Hedefalk, Almqvist, and Östman, (2014) claim in their research that the early childhood teachers interpret ESD simply as the teaching of realities associated with the natural milieu, and

the teachers have habitually involved the kids in the nature activities. Children improve their own admiration for nature, and over time, a recognition that these zones are worth conserving by enabling them to relate to their natural surroundings.

Preschool children are obviously drawn to nature, and by immersing them in their locality and providing them with access to natural resources, such as woodlands, and rivers, they begin to develop environmental sustainability. These practices provide the young pre-schoolers with an authentic ecological opportunity by allowing them to be in nature, lost in their play, gardening to maintain the plants, and learning from their peers and teachers. The results also indicate that by engaging children in close and larger community contexts, children learn cognitive development through their interaction with others in their surroundings. Involving activities in combination with family members and surrounding society add educational benefits to the children introducing them to new perspectives and giving them scope to think beyond their classroom activities. It also helps youngsters become more aware of sensitive situations like street beggars, and the closing of shops due to covid 19. The teachers indicate that children get a better grasp of their world and the consequences of their decisions as a result of talks/conversations that takes place during the process. Kids frequently interact through conversation with family, school peers, and the community during these kinds of activities, and these influences how they perceive the world they live in and what they consider to be priorities in their lives. The children pick up basic knowledge, attitudes, and values from these interactions. Support for this finding comes from Vygotsky's theory of constructivism, as it is highlighted that children learn significant practices when they witness and engage in the daily lives of their families and communities (Vygotsky, 1978). This approach strives to immerse children in their locality, allowing them to form strong bonds with their peers and community and gets a better awareness of the world around them. This accentuates Vygotsky (1978) who argues that a strong link with a close and larger community supports in creating scaffolding helps learners to meet their goals. It involves kids in various forms of learning such as exploration, observation, critical thinking, and social skills, and all of these build patterns in children's thinking about how persons, places, or events relate to each other. Teachers are role models for kids in supporting and providing sustainability skills and competencies (Ärlemalm-Hagsér & Sandberg 2011; Hedefalk, Almqvist, & Östman, 2014).

According to the findings, the preschool teachers are engaged in hands-on participatory activities with their young pre-schoolers. The preschool teachers tailor the activities to the needs and interests of the kids. This hands-on learning approach engages young pre-schoolers in multiple modes of learning namely problem-solving, observation, interaction with one another, exploration, play, creation, and reflections. This teaching approach through hands-on participatory activities is in line with Vygotsky's (1978) social constructivism theory which emphasizes learning built on hands-on learning, active participation, collaborative, and group-based learning which provides learners with opportunities to learn alongside others to gain knowledge and develop their values and beliefs. At the same time, the link is made to the study of Öhman & Sandell (2015) emphasizing learning through hands-on activities, since the preschool teachers indicate this as especially significant and as one of their techniques in fostering ESD practices. The preschool ESD-associated teaching practices in this view, generate and build linkages between the present and a sustainable future.

The teacher participants perceive themselves as capable tutors who scaffold their young pre-schoolers within their zone of proximal development (Vygotsky, 1978), according to the finding. The ability to learn through instructions is essential for cognitive growth, and the ZPD involves all constituents in supporting the student as a learner (Vygotsky, 1978). These help in fostering children's capacity to understand and respect the natural environment and interdependence between humans and non-humans. The teachers obviously demonstrate that they instruct, support the children's learning, and create opportunities, and learning possibilities that are intended to encourage children to act autonomously. The teachers thought they are skilled at adjusting the level of support they provide their children in order for them to succeed at the tasks they were attempting.

According to Vygotsky (1978), the scaffolding strategy is used by the teachers to enable students to transmit from assisted to independent performance. The result of this study is in line with Vygotsky (1978) who argues that employing the scaffolding approach would help students to solve problems and reach their intended objectives. Strategies such as scaffolding help teachers improve children's critical thinking and problem-solving skills, as the teachers indicated during the interview. Thus, the teachers play a role in facilitating problem-solving. This is parallel with the prior study reporting that teachers should be role models for children

in assisting and offering SD/ESD skills (Ärlemalm-Hagsér & Sandberg 2011; Hedefalk, Almqvist, & Östman, 2014). Several attributes of the children's development, social, cognitive, physical, and emotional are taken care of as they thrive through their early childhood education. Therefore, as highlighted above, when teachers give knowledge on issues concerning sustainable development to young pre-schoolers and assist or foster children's opinions and approaches suitably, such children will be more likely to take initiative for a sustainable future hereafter (UNESCO, 2005).

However, the study also shows that when children study in pairs or small groups through various learning activities in collaborative activities, it improves children's communication and social skills of children while enhancing their motivation and participation in group activities. It is noteworthy that collaboration is crucial in the early years because sharing joint attention in activities or tasks is a considerable cognitive challenge in itself. In this view, collaborative learning activities among kids, promote growth because children of similar ages are likely to be operating with one another in proximal zones of development, modeling in collaborative group behaviour more advanced than they could perform as individuals (Vygotsky, 1978). It is noteworthy that collaboration is crucial in the early years because sharing joint attention in activities or tasks is a considerable cognitive challenge in itself. From the interviews, it emerges that interaction and play assisted children when they are working in groups. In order to boost children's willingness to learn, teacher participants believed that play is one strategy to teach children. Using play as a strategy is thus being welcomed by the teacher participants in this study and they believed that children could learn concepts and knowledge in a fun way by adopting a play-based approach. Play is regarded in preschools as a means through which children are likely to learn "Play and enjoyment in all its various forms stimulate the imagination, insight, communication and the ability to think symbolically, as well as the ability to cooperate and solve problems" (Skolverket, 2011, p. 6). Preschool children celebrate and consider questions such as who, what, why, and how, when they are exposed to different play situations on a regular basis. This corresponds to Vygotsky's theory which stresses the significance of play, and how plays include the use of social awareness and language, and it thus enables cognitive development (Vygotsky, 1978).

According to another finding, the preschool teachers' perceptions of SD/ESD impact their teaching approaches, which aligns with what, Corney and Reid (2007) noted that the "ability and capacity to address ESD at school level depend on the teachers' knowledge and beliefs on subject matter and pedagogy" (p. 34). Such findings can be attributed to fact that the teachers cannot link their holistic understanding of ESD to their teaching practices.

7. Recommendations and Conclusion

7.1. Implications for Practice

The results of this study provide implications for ESD in preschools, teacher training, professional development, and curriculum.

In line with the result that the environmental and social aspects of ESD are the main predominant idea in the teachers' responses and these come up frequently when they share their perceptions of ESD and approaches to nurturing ESD practices in preschools; and some teachers' comments are also restricted to the environmental dimension, the need to protect and respect the environment has implication in the area of teachers' training, the most significant of which is that individuals who are responsible for teacher education and professional studies need to incorporate extensive training on ESD issues.

Considering the preschool teachers as implementers and guides of early childhood education, play a significant part in young children's sustainability (Davis, 1998; Elliot, 2010; Wilson, 1996; 2010), it is important that the teachers are aware of the three components of ESD, namely, environment, social, and economic in relation to each other, and how these will be implemented in their teaching approaches, and it is important that all of them are taken into account when policies and practices are being developed. Thus, there is a need for more knowledge about all the three dimensions of SD/ESD so that the interconnectedness of these can be understood and implemented by the teachers in their teachings. The fact that ESD is comprehensive and encompassing and the term's ambiguity (Bolis et al. 2014; Jickling & Wals, 2008) in relation to ESD-related pedagogy would be also very important to be highlighted in teacher training. Alongside this, emphasis should be laid on the provision of professional development and improving ESD teaching practices. This indicates that in order to promote ESD practices in

preschools, teachers should understand the connections between the three aspects of ESD in relation to their teaching practices. It is crucial to intervene in the educational context beginning in early childhood when skills, knowledge, behaviours, attitudes, and habits are developed in order to contribute to the education of responsible citizens (Pramling Samuelsson & Kaga, 2008).

Furthermore, ESD is incorporated into the Swedish curriculum for preschools, and it means that at preschools, ESD is being provided in their practices and learning. According to the findings of the study, the teachers stated that the curriculum provided a guide to their teaching, and it is significant in engaging young pre-schoolers in the ESD practices. It is feasible on the part of teachers, to bring a change in children's knowledge with the goal of building a sustainable society.

7.2. Implications for Further Research

Previous literature such as Ärlemalm-Hagsér and Sandberg (2011) underlines the necessity for further research investigating teachers' perceptions and understanding of ESD as well as more insight into the subject matter. The result of this study provides an understanding of early childhood teachers' perceptions of ESD as well as their teaching practices for nurturing ESD practices in Swedish preschools, and how teachers' perceptions of ESD relate to their teaching practices. Some implications for future research can be drawn from the results of this study as described below.

It became apparent that the environmental and social dimensions are the key predominant notion in the preschool teachers' responses, and these come up recurrently in the interview when they share their pedagogical approaches to ESD. Some teachers also limit their statements only to environmental concerns and the necessity to respect, protect, and care for the natural environment. Besides, as discussed above, there is a gap between the teachers' understanding of ESD in relation to their teaching approaches. Further studies would be beneficial in order to conduct deeper insight into the teachers' perceptions of ESD and their teaching techniques in schools focusing on the teachers' holistic understanding of ESD in relation to their ESD

implementation in schools. To fulfill this purpose, combining both qualitative interviews with preschool teachers and observations of their practices in both indoor and outdoor activities will be crucial, adding observation will triangulate teachers' responses in relation to their perceptions and approaches to ESD issues. Furthermore, future research could also establish a triangulation by combining qualitative and quantitative methods.

Another implication for further research relates to the participants of this study. All the participants in this study were from one region in Sweden and they also teach in preschools in the same region namely, Stockholm. A research study incorporating participants from other regions in Sweden could give more insight into the phenomenon studied, and it would extend the possibility of examining preschool teachers' perceptions of ESD and their teaching approaches to nurturing ESD practices in preschools. The sample of this study is limited and cannot be generalized. The scope could be extended because this current study focused on participants' perceptions of the phenomenon of ESD, preschool teachers from different regions in Sweden have the potential to contribute distinct viewpoints based on their diverse lived experiences. Thus, further studies are necessary to substantiate these findings and investigate this issue in more detail.

7.3. Conclusion

The present study examines Swedish preschool teachers' perceptions of ESD and their pedagogical practices relating to ESD. Lev Vygotsky's social constructivism was employed in this study as a theoretical framework that emphasizes the implications of language and thought, zone of proximal development, social interactions, scaffolding, mediation, and collaborative work in learning. These concepts and principles establish the framework for examining the study. A phenomenological qualitative research approach was utilized to guide the method used in this study. Data were collected through semi-structured interviews from the teachers and were analyzed by using thematic content analysis (Braun & Clarke, 2006).

As mentioned above, one overall result of the study is that preschool teachers are familiar with the ESD concept, and they use it as part of their regular educational teaching on daily basis.

This study illuminates the results on the relations between the teachers' understanding and their approaches to promoting ESD. Six themes emerged in the teachers' perceptions of SD/ESD, and the teaching approaches they reported involved seven thematic areas which entail different teaching approaches. The teachers are unable to relate their understanding of SD/ESD as integration of environment, social, and economic dimensions to their teaching approaches. It was recognized that the three components of ESD namely, economic social, and environmental are considered by most of the teachers as interrelated from the teachers' understanding of ESD, but during their reports on the approaches, environmental and social aspects are their focus, with the environment as the main emphasis by some teachers. As a result, this study concludes that teachers can establish better connections between their understanding to their teaching practices. Thus, the findings recommend that there is a need to widen their knowledge of the three dimensions of ESD so that, the interconnectedness of these can be understood to ensure the effective incorporation of ESD into their teaching practices in schools. Thus, this study suggests that those who are responsible for teacher education and professional studies need to incorporate extensive training on ESD issues. The findings have added significance to the previous research conducted in the field of ESD in early childhood education, precisely research into preschool teachers' understanding of ESD and those that emphasize ESD-related teaching practices at the level of early childhood education. This study also contributes to understanding preschool teachers' pedagogical practices relating to ESD.

Further studies would be beneficial in order to conduct deeper insight into the teachers' perceptions of ESD and their teaching approaches in schools focusing on the teachers' holistic understanding of ESD in relation to their ESD practices implementation in schools. Future research could establish a triangulation by combining qualitative and quantitative methods. Also combining both qualitative interviews and observations of their practices in both indoor and outdoor activities will be crucial, adding observation will triangulate teachers' responses in relation to their perceptions and approaches to ESD issues.

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9. Appendices

9.1. Appendix 1

Letter of invitation to participate

Dear (name)

My name is Rose Anyanwu. I am a master's student in the field of Education for Sustainable Development (ESD) in the Department of Pedagogical Curricular and Professional Studies at Gothenburg University.

This letter is an invitation to consider participating in a study I am conducting for the completion of my master's degree. I am conducting a study on preschool teachers' perceptions of Education for Sustainable Development (ESD) and teaching approaches in nurturing ESD practices in young pre-schoolers as well as how their experiences of ESD connect to their teaching practices. So, I am interested in your reflections, experiences, and opinions about Education for Sustainable Development practices, and your teaching approaches, particularly in preschool which is the focus of this research. I will therefore interview you on this.

I will provide you with more information about this study and what your involvement would entail if you chose to participate. The interview will be in the English Language.

I look forward to hearing from you.

Kind regards,

Rose

9.2. Appendix 2

Information on Research Study

Dear (name)

Thank you for your positive response, and I appreciate your taking the time to respond to this email and, for agreeing to participate in this research.

Here is the outline of my research as well as the informed consent information which I believe will assist you to better understand my research, and your participation in the study.

Topic- Nurturing Education for Sustainable Development (ESD) Practices in Pre-schools.

Summary of the study statement- A qualitative study of preschool teachers' perceptions and teaching approaches in nurturing Education for Sustainable Development practices in Swedish preschools. The researcher is interested in preschool teachers' reflections, experiences, and opinions about Education for Sustainable Development practices, and teaching approaches, as well as how their perceptions of ESD relate to their teaching practices, particularly in preschool which is the focus of this study.

Purpose of the research- The study aims to increase an understanding of preschool teachers' pedagogical practices on ESD and add to the scientific literature in the field.

Procedures- Participation in this interview will take no more than one hour. It will be recorded with your permission, and it will take place at a mutually agreed place, day, and time. You are also free to choose to have the interview through Zoom, or face-to-face.

Confidentiality- The data gathered during the interview will only be used for this research. Your name and school's name will not be used in my study. I will make sure that I store all the information I gather securely, and that individual discussions during the interview will be confidentially kept.

Freedom to withdraw- Participants have the option of opting out of the study at any point. This means that you are free to decide not to participate in this study or to withdraw at any time without being questioned.

I would appreciate your consent to be involved as described. Feel free to contact me if you require any more details about the study.

I look forward to hearing from you about the place for the interview, the day, and the time you will be available for the interview.

Kind regards, Rose

9.3. Appendix 3

Interview guide

Introduction

Hello (name),

My name is Rose Anyanwu. I am a master's student in the field of Education for Sustainable Development (ESD) in the Department of Pedagogical Curricular and Professional Studies at Gothenburg University. As I have highlighted earlier in the previous letters, I am carrying out a study on preschool teachers' perceptions of Education for Sustainable Development, and teaching approaches in nurturing ESD practices in young pre-schoolers as well as how their perceptions of ESD relate to their teaching practices. I hope this research will help us understand preschool teachers' pedagogical practices on ESD and add to the scientific literature in the field. So, I am interested in your individual experiences, reflections, opinions about ESD practices, and your teaching approaches, specifically in preschool which is the focus of this study.

I expect that the interview will take no more than one hour. I would like to record the interview with your permission so that I do not miss any details for analysis later. The data gathered during the interview will only be used for this research. Your name and school's name will not be used in my study. I will make sure that I store all the information I gather securely, and that individual discussions during the interview will be confidentially kept. You are free to decide not to participate in this study or to withdraw at any time without adversely affecting your relationship with the researcher.

I would appreciate your consent to be involved as described. Feel free to contact me if you require any more details about the study.

Any question/s before we start?

1st Part- Background Questions

Let me begin by asking a few questions about your background.

-How old are you?

-How long have you been a pre-school teacher in Sweden? Tell me about the institution(s) you worked at.

-Can you tell me about your educational background (University education, teacher education, etc). What is your level of education?

-Have you ever participated in any Education for Sustainable Development (ESD) program during or after your preservice teacher education? If yes, what was the focus, and in what respect was it useful for you? What drew you to a need to improve yourself through these ESD training in the first place?

2nd Part- Content Questions

A: Understanding of ESD (concepts, principles, values, etc)

1- (a) What is your understanding of Sustainable Development (SD) and Education for Sustainable Development (ESD)? (b) What do you think are the essential concepts, principles, and dispositions that are critical in defining and promoting them?

B: Significance of addressing ESD issues with young learners

2- (a) How critical do you think it is to address ESD issues and practices with young preschool learners? (b) Do you think the kids at this age should be aware of these issues, challenges, and actions in line with ESD?

C: Classroom activities used in addressing ESD

3- (a) What ESD-related issues do you address in your class? In what ways? How do you plan your lessons? Can you provide some concrete examples of these issues?

(b) What activities/strategies do you use in your regular teaching to incorporate and promote ESD in your class? What are your challenges? Why do you employ these techniques?

(c) Any suggestions on how to make these teaching methods more effective? Why do you think that ESD-related activities are critical and can promote ESD practices in young pre-schoolers?

D: Out of Classroom activities to address ESD issues

4-(a) Apart from classroom teaching, can you tell me about any other ESD-related initiatives in which your preschool learners are involved? How engaged are they in the projects/s? (b) What are you hoping to achieve while doing these activities with young pre-schoolers?

E: Positioning formal Curriculum in ESD activities

5 -(a) How do you see the position of curriculum to guide these activities/projects at the preschool level? Are there impediments or motivations that you draw from the curriculum? How do you deal with these, and what do you think about their impact on your practice?

F: ESD knowledge in relation to teaching approaches + Improving ESD further

6-(a) What are your views towards ESD in relation to your everyday teaching? (b) In your opinion, what do you think can be done to improve the teaching of ESD practices at the pre-school level? Consider curriculum, teacher education, collaboration among teachers, policymaking, etc. (c) Any role for the parents? Their interaction with the school on these matters?

Thank you. Have you any other thoughts, clarifications, or whatever you want to add?

Appendix 4

Themes and Codes Identified from Data Analysis

Themes	Codes
Teachers' perceptions of ESD ***Themes:*** -SD as environmental responsibility	Going and taking children to the wood; respecting nature, taking responsibility; towards nature: caretaker of nature; the need for recycling; avoiding something that is not environmental friendly; saving energy,

	garbage sorting; fostering respect when it comes to nature; avoid destroying the environment;
-SD/ESD as an integration of environmental, social, and economic components	ecological, economical, and social interconnection; diverse meaning split in three; one's social, one's economical, and one's ecological; think nature more than social and economic factors; relationship with one another;
-SD as a means of minimizing our carbon footprint	Lifestyles; reuse; put out light when necessary; the use of water; environmental impacts; daily lives and impact on nature;
-ESD as a lifelong process	Sustainable future for our kids; ESD is a process and happening all the time; using the right materials; making children's senses more informative; grow up as mature adults; quality of life after us; ESD beginning at early age;
-ESD as a source of environmental awareness and behaviour	Collecting and picking trash/rubbish, environment; wellbeing; plastic harmful for animals; animals going to hibernation; composting; rubbish lady drama; watering the garden; awareness of the environment;
-ESD as skilled-based education practices in preschools	Blue-bots for programming and problem solving; using technology; problem solving; mathematics; critical thinking; didactic questions;
Teaching approaches in ESD ***Themes:*** -Taking children outdoors	Picking of *kantareller* [type of mushroom in Sweden]; walks in the wood and forests; physical variation of movement; outing; connect with outside world; outdoor activities;
-Scaffolding	Language and communication; open ended questions; teacher inviting the children to ESD activities; teacher as facilitator; learner-centred teaching; care supervision and education; being model for children; engaging the kids; respecting children's interest; supporting the kids; the use of language, communication; engaged and observant;

-Hands-on participatory activities	Projects, observation, and engaging of children in the activities; growing vegetables; encourages children's participation in recycling; planting the seed in the soil; growing vegetables; hands-on materials; experimentation; painting; exploration; create; the curiosity of children;
-Collaborative teaching and group activities	Engaging pre-schoolers in a discussion about sustainable practices; interaction with each other; singing and rhyming of forest animals; fairy tales and contemporary stories; children using their senses in learning; splitting the children into different groups; circle time activity; discussions; improves cooperation;
-Play	Play; playground; creating games; using drama; learning through play;
-Engagement of children in close and larger community contexts	Exposing children to nature in the vicinity, recycling stations; collaborating with Kommun [municipality]; free play; visit to Vattenfall; recycling station in the neighborhood; local products; link with the community; diverse method of practices; gaining parents approval and backing; involving parents; role of parents;
-Making use of Swedish preschool curriculum	Läroplan [curriculum]; a tool and guide; is like umbrella; an inspiration;
Relations between understandings and approaches for promoting ESD -Themes (teachers' perceptions of ESD) + Themes (teaching approaches in ESD)	 Codes (teachers' perception in ESD) + Codes (teachers' approaches in ESD)